(54) GENERATING ELECTRICITY BY USING WORKED OUT, OR UNECONOMIC COAL MINES, AS COMPRESSED AIR RESERVOIRS, OR GAS TURBINE COMBUSTION CHAMBERS

(71)   I, ARTHUR PAUL PEDRICK, a British Subject of 77, Hillfield Road, Selsey, Sussex, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention is concerned with the manner in which electrical energy might be converted to some other form energy which can be stored in large quantities, at non peak periods of electricity demand, during the summer months or during the winter, at certain periods of the day, for conversion back to electricity, to boost output from the main power stations, during the peak demand periods in the winter.

In the present concept it is proposed to use coal mines that have been worked out, or become uneconomic, as large reservoirs, for compressed air, driven into them by electrically driven pumps, such compressed air being used to drive air turbine-driven dynamos at peak electricity demand times, or if the disused coal mine has two shafts to use the complete coal mine as a very large combustion chamber for a gas turbine, with compressor and turbine at the surface.

Thus in the accompanying drawings.

Figures 1 and 2 relate to vertical cross section and plan views of a disused coal mine, made air tight by suitable scaling at the top of the main shaft, and otherwise where necessary, and then used as a vast compressed air reservoir for energy storage, and

Figure 3 shows an uneconomic, or nearly worked out, coal mine used as the very large combustion chamber of a gas turbine plant.

Described, very briefly, with reference to Figures 1 and 2, a disused coal mine has the top of its shaft plugged up with concrete, or suitable material and electric motors A, B, and C, paired with air compressors D, E, F,

drive air down through a pipe through the centre of the concrete plug to force a large charge of compressed air into the large volume of the mine at times of the year, or day, when there is a surplus of electric generating capacity over demand.

This large charge of energy, stored as compressed air is used to drive air-turbines G, H, J, coupled to dynamos K, L, M, to produce electricity to feed into the grid system at peak demand periods for electricity, the 3 pairs of electrically driven compressors and turbines being quite exemplary in number.

In Figure 3, where is shown an uneconomic coal mine, not completely worked out, as far as its coal is concerned, the mine is made to form a very large combustion chamber for a gas turbine plant, as a whole, the compressor X/α driving air down one shaft, which, after being heated to burning coal or coal dust, passes up the other shaft to drive a gas turbine Y/α, the turbine rotor being coupled to the compressor rotor by a shaft which includes in its drive, a generator Z feeding power into the grid system. Such a gas turbine formed from an uneconomic coal mine could, of course, be operated at any time, not just at peak demand times.

WHAT I CLAIM IS:—

A method of generating electricity, in which a disused, or uneconomic, coal mine is used either as a very large compressed air reservoir charged by electrically driven air pumps, for energy storage, the air being used to drive an electricity generator for reconversion of its energy to electricity or as a very large combustion chamber for a gas turbine plant with compressor, and turbine, at the surface, driving an electricity generator.
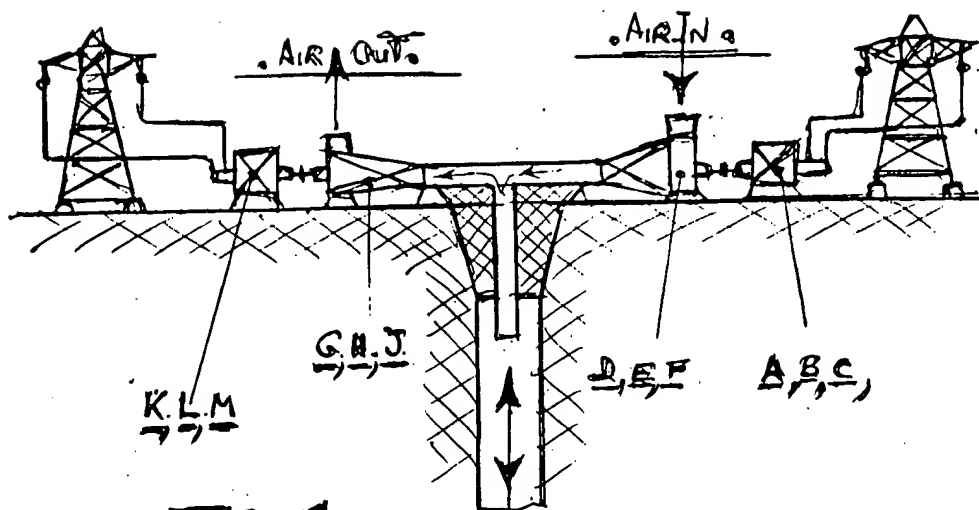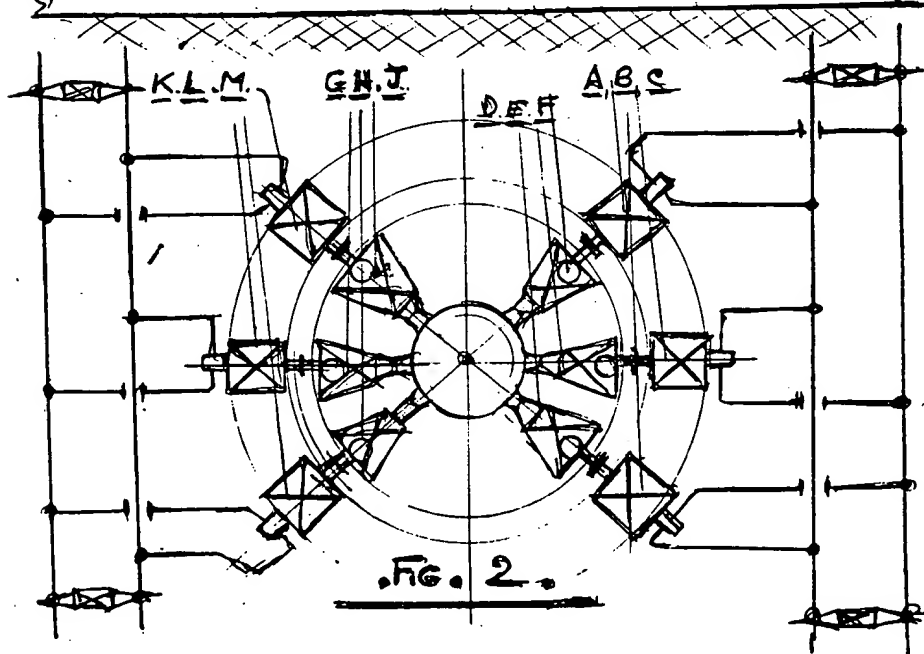
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AIR OUT.   AIR IN.

G.H.J.

K.L.M.   D.E.F   A.B.C.

FIG. 1.

DISUSED COAL MINE.

K.L.M.   G.H.J.   D.E.F   A.B.C

FIG. 2.

.Hot Air Out.

.Cold Air In.

.Y.

.X.

Turbine.

.Z.

Compressor.

.Generator.

.Coal Burning.

.Disused But Not Worked out.

Coal Mine.

.Fig. 3.